Composition, Condition, and Function of Global Land Vegetation
Compton J. Tucker
NASA Goddard Space Flight Center

NASA's Earth System Science satellite observations provide understanding of global vegetation undreamed of 40 years ago. Not only can we map vegetation associations globally and determine where they change, but we can map their condition and function through time. This understanding has led to accurate estimates of global land carbon dioxide uptake via photosynthesis, accurate maps of global land cover and land cover change, first-order estimates of carbon stocks in vegetation, estimates of trace gas fluxes to the atmosphere from biomass burning, and has identified changes in vegetation from climate forcings, all important for understanding climate change. This has been accomplished through the synergy of Landsat and Landsat-like sensors (i.e., ASTER) with the time series instruments of MODIS and its antecedent instruments, the AVHRRs. These unique land observations have quantitatively answered questions about land-atmosphere interactions, deforestation, threats to biodiversity, desertification, land use changes, famine early warning, drought detection, and global agricultural production. Their continuity since the early 1970s and 1980s has been a major accomplishment of NASA's Mission to Planet Earth, providing an indispensable understanding of the role of land vegetation in climate as we face the daunting challenge of climate change.